

# MILBANK, TWEED, HADLEY & McCLOY LLP

1850 K STREET, NW, SUITE 1100

WASHINGTON, DC 20006

202-835-7500

FAX: 202-835-7586

Lafayette M. Greenfield

DIRECT DIAL NUMBER

+1 (202) 835-7564

E-MAIL: LGreenfield@milbank.com

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**LOS ANGELES**

424-386-4000

FAX: 213-629-5063

**WASHINGTON, D.C.**

202-835-7500

FAX: 202-835-7586

**LONDON**

44-20-7615-3000

FAX: 44-20-7615-3100

**FRANKFURT**

49-69-71914-3400

FAX: 49-69-71914-3500

**MUNICH**

49-89-25559-3600

FAX: 49-89-25559-3700

**BEIJING**

8610-5969-2700

FAX: 8610-5969-2707

**HONG KONG**

852-2971-4888

FAX: 852-2840-0792

**SEOUL**

822-6137-2600

FAX: 822-6137-2626

**SINGAPORE**

65-6428-2400

FAX: 65-6428-2500

**TOKYO**

813-5410-2801

FAX: 813-5410-2891

**SÃO PAULO**

55-11-3927-7700

FAX: 55-11-3927-7777

## **VIA ELECTRONIC FILING**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street SW  
Washington, DC 20554

**Re: *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters (IB Docket 16-408)***

Dear Ms. Dortch:

On May 30, 2017, Space Norway AS (“Space Norway”) met with Nicholas Degani, Senior Counsel to Chairman Pai; Erin McGrath, Legal, Wireless, Public Safety, and International Advisor to Commissioner O’Reilly; Daudeline Meme, Legal, Wireless, International, and Public Safety Advisor to Commissioner Clyburn; and Jose Albuquerque, Karl Kensinger, Chip Fleming, Jennifer Balatan, and Sankar Persaud (via teleconference) of the International Bureau’s Satellite Division. Space Norway was represented by Kjell-Ove Skare, Project Director and Head of Strategy and Analysis; Birger Johansen, System Engineer (Technical); Anton Bolstad, System Engineer (Regulatory); and Phillip L. Spector and Lafayette Greenfield, attorneys for Space Norway.

The meetings focused on the information contained in the enclosed PowerPoint presentation, copies of which were provided to the Commission representatives.

Pursuant to the Commission's Rules, this *ex parte* letter is being filed through the Electronic Comment Filing System for inclusion in the public record, and is being e-mailed to the meeting participants.

Very truly yours,

/s/ Lafayette Greenfield

Phillip L. Spector  
Lafayette Greenfield  
*Attorneys for Space Norway AS*

cc: Nicholas Degani  
Erin McGrath  
Daudeline Meme  
Jose Albuquerque  
Karl Kensinger  
Chip Fleming  
Jennifer Balatan  
Sankar Persaud

Enclosure



# **The Arctic Satellite Broadband Mission: Bringing Broadband to the Arctic**

**PRESENTATION TO THE U.S. FEDERAL  
COMMUNICATIONS COMMISSION  
IB Docket No. 16-408**

**MAY 30, 2017**



## Why are we here?

- Space Norway will provide broadband to unserved and underserved user groups in the Arctic region
- System uses two satellites in Highly Elliptical Orbit (HEO), with one active at any one time (except for brief handover)
- Proposed NGSO constellations of hundreds or thousands of satellites promise Arctic coverage, but
  - These constellations will cause harmful interference to the ASBM HEO system unless avoidance measures are taken
- Difficult for a HEO system to avoid in-line events, but possible for other NGSO systems to avoid interference to a HEO system
- NGSO constellations can co-exist with ASBM, thereby assuring service to the public, competition, and spectrum efficiency

## Who is Space Norway?

- Established in 1995 as part of the Norwegian Space Centre (government agency), as a vehicle for the Centre's operational activities
- From January 1, 2014, a state-owned enterprise
- Mission of Space Norway is to own and lease space-related infrastructure, and to invest in space-related activities



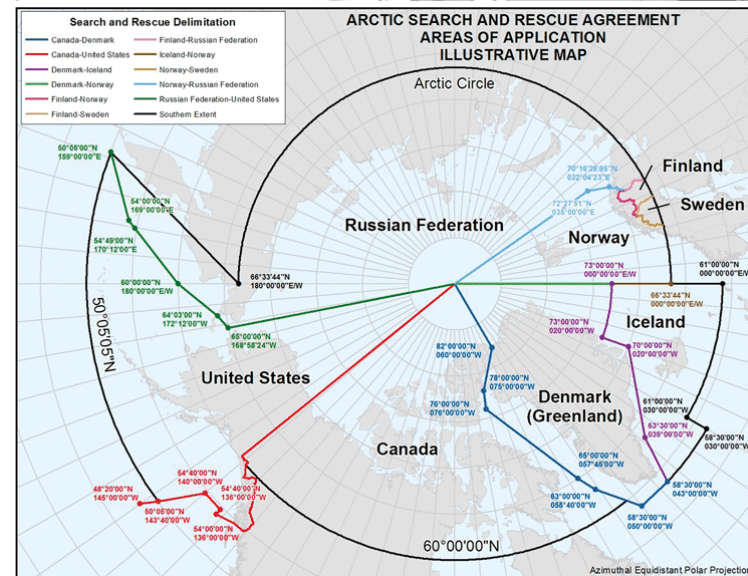
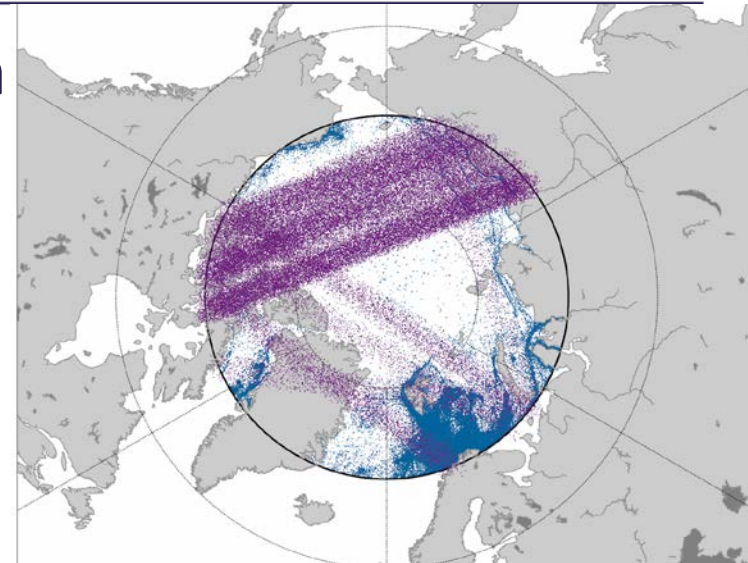
## Communications in the Arctic – the challenge



- Underserved region due to
  - Lack of coverage from GSO satellites
  - Low population density
  - Extreme environment
  - Costly on per-user basis
- In practice, only Iridium and shortwave radio are available for communications north of 75° N

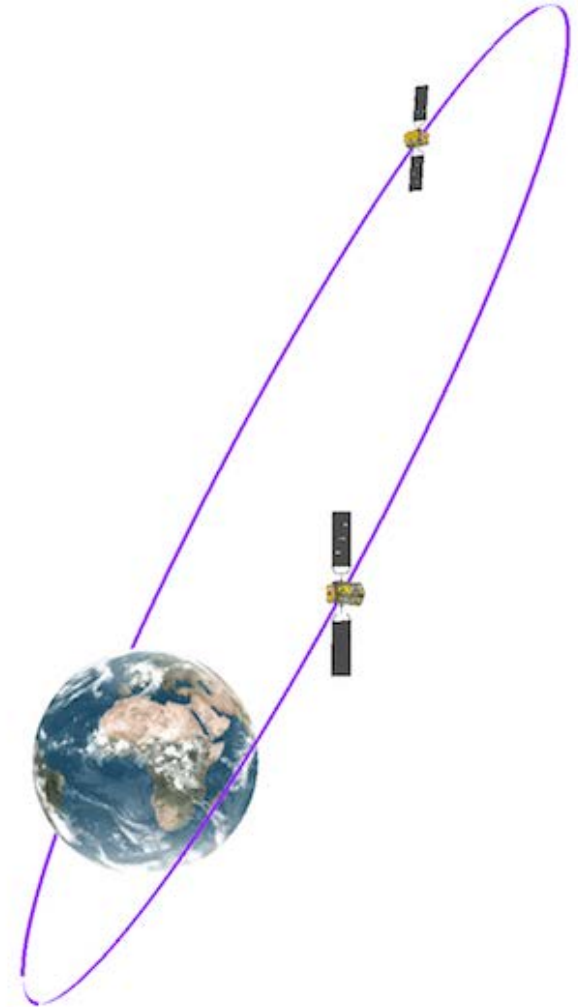
# Arctic Satellite Broadband Mission

- ASBM will serve users north of 55° N with GSO-like satellite broadband
  - Land-based fixed and mobile applications
  - Maritime and aero services (including US-Europe and US-Asia flight routes)
  - Service to local villages and local governments in Alaska and Canada
  - Search and rescue (SAR)
  - Research/ environmental protection
- Strategically important to Norway, the United States, and allied nations



## Satellite system

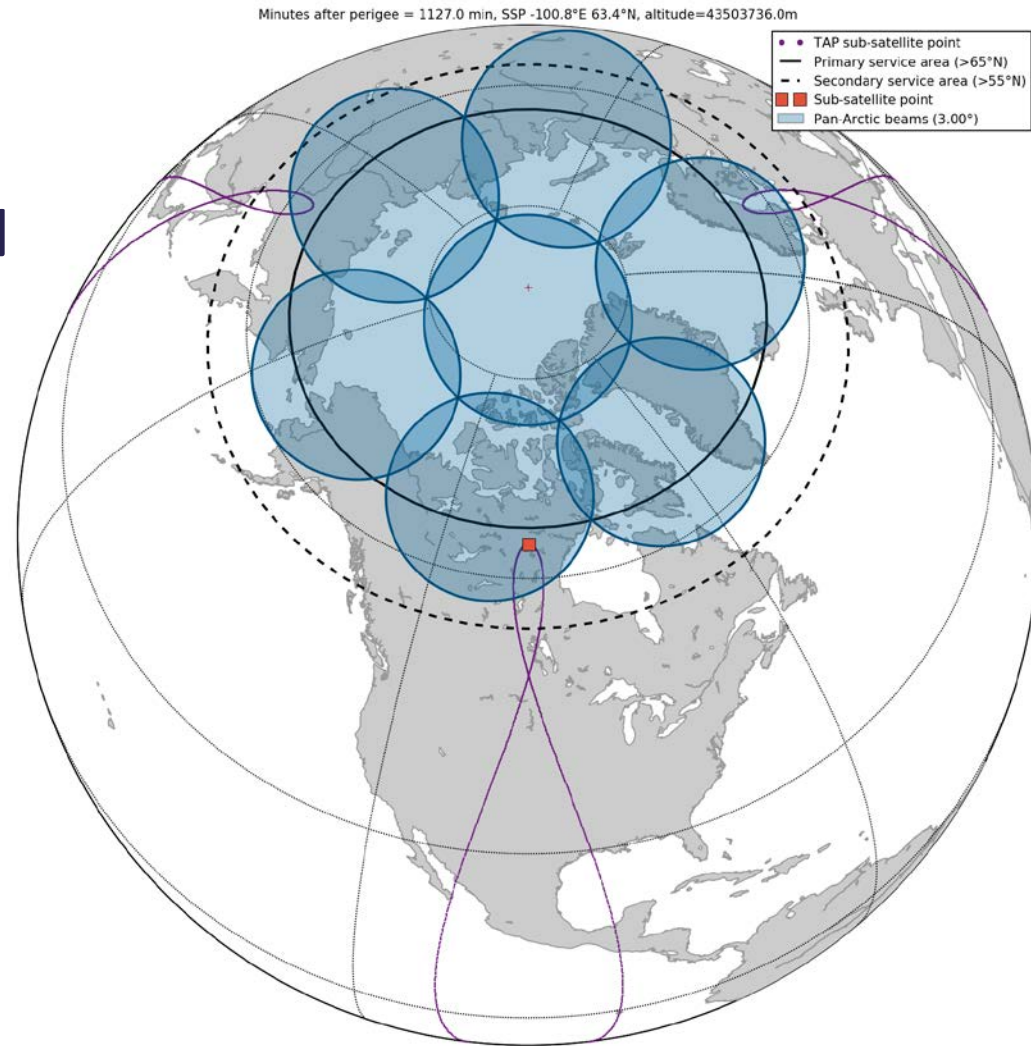
- Two satellites in one HEO orbital plane
  - One active satellite at any one time (except brief handover)
- Well-proven, flight-tested GSO technology
- 15-year nominal service life
- Inherently compatible with GSO, no need for special GSO arc avoidance techniques
- Compliant with FCC and ITU EPFD Limits





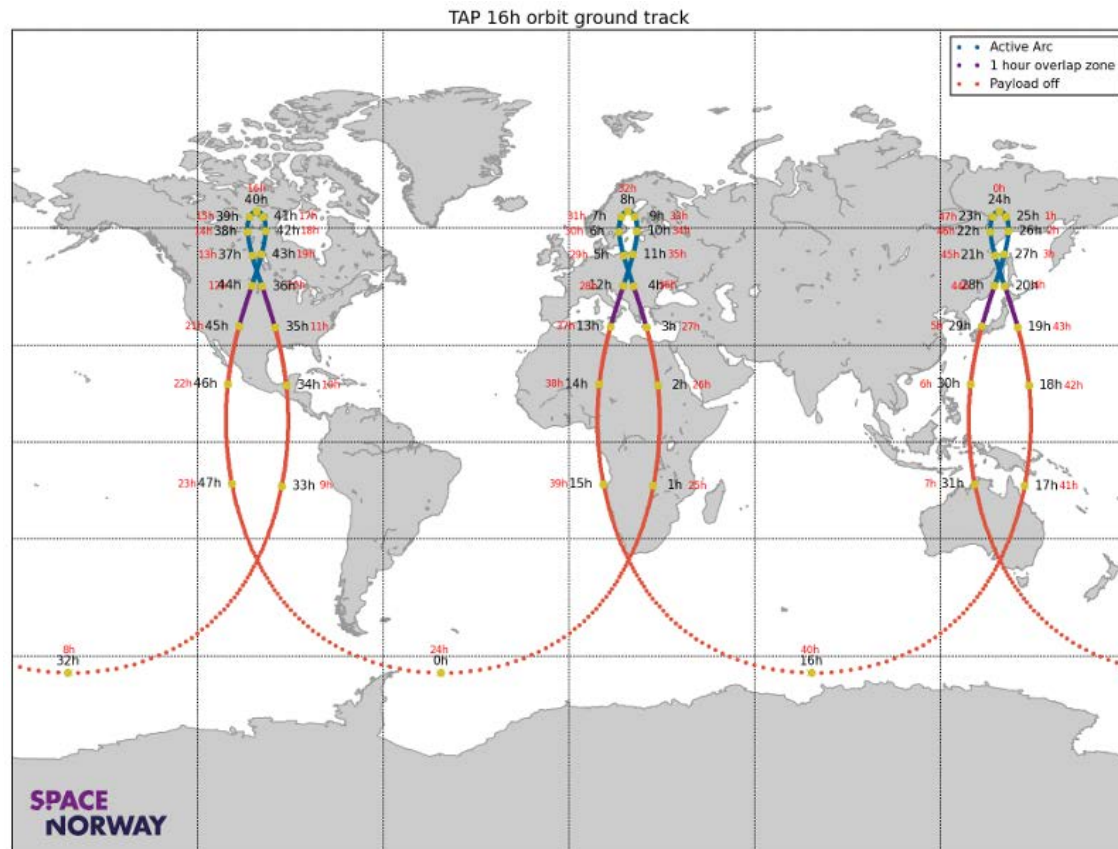
# Coverage/User Terminals

- Coverage north of 55° N (including Alaska and US SAR area), using 7-beam cluster
- GSO-like power levels and performance enable dual use of GSO user terminals



# Petition for market access in the US

- North of 55° N, including Alaska
- Ku-band  
2x250 MHz within  
14.0-14.5/10.7-12.7 GHz
- Ka-band  
2x500 MHz within  
29.5-30.0/19.7-20.2 GHz
- Norwegian ITU filing  
NORSAT-H1



## **In-line interference - the ASBM perspective**

- A single ASBM beam is very wide and thus would be affected by multiple lower-altitude NGSO satellites from the same constellation, creating a high probability of harmful in-line interference events
- If large NGSO constellations with hundreds or thousands of satellites were operational, there would be a continuous stream of satellites entering the in-line interference zone of ASBM
- The resulting in-line interference events would be impossible for ASBM to manage
- Net result: ASBM operation would be restricted to “home base” spectrum, harming service to public and using spectrum inefficiently

## **ASBM – more in common with GSO satellites than with NGSO constellations**

- Single active satellite that is quasi-stationary in its active phase (8 hours)
- Similar to a GSO satellite from an NGSO interference perspective
- Wide coverage area comparable to a GSO satellite
- GSO-like services in areas where GSO services are limited or unavailable
- Compatible with GSO user terminals
- Could be classified as a “Quasi-GSO” (QGSO) system



## **Why should the FCC facilitate operation of Quasi-GSO systems?**

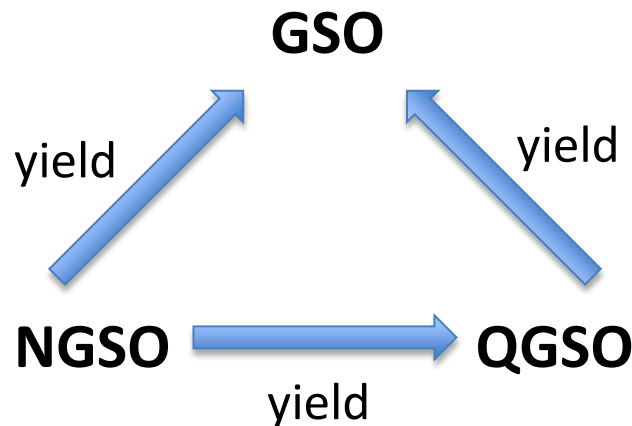
- Almost impossible for QGSO system to avoid in-line events with large NGSO constellations
  - More sophisticated satellites do not alleviate the situation
- Relatively easy for NGSO systems to avoid in-line events with a QGSO system
  - Spectrum reuse techniques already have to be implemented by NGSO constellations to avoid GSO interference, and to avoid in-line interference into other NGSO systems

# Why should the FCC facilitate operation of Quasi-GSO systems? (cont'd)

- Public Interest Benefits
  - Serve unserved and underserved populations, government users
  - Ensure efficient use of scarce spectrum resources
    - Under current approach, the Ku- and Ka-bands would be effectively segmented, with each NGSO system restricted to “home base” spectrum
    - Under proposed approach, both the QGSO system and LEO/MEO systems could use all of the Ku- and Ka-band spectrum requested by each system
  - By allowing multiple systems to use all of their requested spectrum, the proposed approach would ensure:
    - Better service to the public
    - More competition
    - Lower prices

## Proposed approach in rulemaking proceeding

- Revise Sec. 25.261 of FCC Rules (in-line interference avoidance) to create a separate category for QGSO systems



- Spectrum sharing between QGSO and NGSO systems: apply approach used in GSO/NGSO regulation to QGSO/NGSO co-existence

## Conclusion

- A QGSO system is an especially cost-effective way to provide broadband to unserved and underserved areas in the Arctic
  - Including Alaska
- Spectrum efficiency will be improved by protecting a QGSO system from in-line interference from NGSOs
- Levels the playing field between a QGSO system and the large NGSO constellations
  - Facilitates competition, lowers prices to users
- The FCC should therefore establish a regulatory framework that facilitates the operation of a QGSO system among the proposed NGSO constellations